RHODORA, Vol. 104, No. 920, pp. 434–438, 2002

NEBC MEETING NEWS

September 13 Field Trip. Fourteen NEBC members assembled in a light, misty rain at Kettle Pond in Groton State Forest, Vermont, for a leisurely field trip. Art Gilman introduced the area and pointed out the salient landscape features. Groton State Forest is the largest state-owned parcel in Vermont with nearly 26,000 acres of managed forest lands. The area is underlain by the granitic Knox Mountain pluton, which outcrops in the numerous hills, and the soils are acidic and relatively nutrient-poor, being derived from glacial till of mostly local origin.

Leaving the parking lot, the first item of interest was a severe gall problem noted on the leaflets of *Rhus typhina*; these large (marble-sized) hollow galls were filled with insects that Don Miller tentatively identified as Homoptera (*Aphis*). Further along the trail, the ericaceous shrub community dominant along the shoreline of Kettle Pond included *Kalmia angustifolia, Vaccinium myrtilloides, Chamaedaphne calyculata, Rhododendron groenlandicum,* and *R. maximum.* Also present were typical associates such as *Ilex verticillata* and *Nemopanthus mucronatus,* the latter in particularly handsome fruiting condition. The numerous shrubs of *R. maximum* were observed in healthy condition despite their location near the eastern wind-exposed shore of the pond. They bore numerous capsules and had obviously flowered abundantly this year. Here and at other stations in Groton State Forest the species is disjunct from its main range by approximately 100 miles.

The group next crossed Route 232 to the old railroad bed, now a popular hiking trail. Underneath a large granite boulder along the side of the trail was a small stand of the uncommon luminous moss, *Schistostega pennata.* Due to drought conditions, the typically reflective protonemal mat could not be observed, but the tiny feather-like fronds were readily observed with a hand lens.

A short hop by car brought the group to Owl's Head, by which time the rain had stopped and the clouds lifted to provide excellent views of Kettle Pond and the southern portions of the Forest. The bald granite knob, although highly trampled by hikers and sightseers, nevertheless provided numerous items of botanical interest. *Potentilla tridentata* and *Solidago simplex* subsp. *randii* var. *randii* were evident, and various shadbushes (*Amelanchier* spp.) were discussed without reaching consensus. A highlight for

many was a small tree of the high-elevation *Sorbus decora* (here at 1900 ft.) with large orange fruit and short blunt leaflets. This was easily compared to an adjacent specimen of *S. americana* with smaller, slightly redder fruit. A brief search for *Rhododendron canadense*, although known from Owl's Head, failed to reveal this emblem of the Club's official publication.

On the short hike down to the parking lot, Melanie Schori pointed out script lichen (*Graphis scripta*) on the bark of several trees, and Don Lubin was able to find a small stand of *Diphasiastrum habereri*. At the end of the trip, the skies promptly cleared to bright sunshine as members returned to their cars for the trip to St. Johnsbury for the evening meeting.

September 2002. The evening meeting was held at the Fairbanks Museum and Planetarium in St. Johnsbury, Vermont. Vice President Arthur Gilman introduced Marcia Spencer-Famous, who spoke to the Club on "The Feasibility of Peatland Restoration." Marcia and her husband, Norm Famous, have teamed to study the possibility of restoring raised peatlands following extraction, or mining, of the peat. This issue has become of special interest because extraction of horticultural and fuel peat using processes that drain and remove peat over large areas started in the twentieth century. In North America, most of such activity is in Canada, with only limited extraction in the United States.

Marcia began by reviewing the formation of raised peatlands (raised bogs), stressing that the hydrologic regime of these systems results from a peat accumulation process, which takes thousands of years and is an integral part of the resulting ecosystem. Because horticultural peat, being largely the partially decomposed remains of *Sphagnum*, retains water in large amounts, such systems are similar to saturated sponges with the upper layers above the regional groundwater level. They can range from relatively simple systems to large complexes that are a mosaic of multiple domes, secondary ponds, and a variety of other wetland types, as Marcia amply illustrated with aerial photographs. In addition to *Sphagnum*, raised bogs host a suite of plants adapted to acidic conditions, low nutrient availability, and saturated organic soils. In addition to woody ericads, some plants commonly found in raised peatlands include *Rubus chamaemorus*, *Geocaulon lividum*, *Calopogon tuberosus*, and *Eriophorum vaginatum* var. *spissum*.

Production of horticultural peat involves developing a bog by excavating perimeter (primary) ditches, installing cross-drains called field (secondary) ditches, removing vegetation over large areas, and crowning the areas between the field ditches to form mining fields. During the summer each year, the surface is scarified to promote air-drying and the top ¼ to ½ inch of peat is mechanically vacuumed or removed using a milling process. Typically, up to 4 inches of peat is removed per year. Until the last two decades, in-kind restoration of peatlands abandoned after mining was not a priority, but today's environmental laws and ethics are forcing a new look at the situation.

When merely abandoned, mined bogs present a variety of environmental problems that make reestablishment of any wetland vegetative cover, not to say restoration to original community, extremely difficult. High soil acidity, low and/or changed nutrient levels, changes to the soil structure and the hydrologic regime, drought-like surface conditions (caused by drainage and crowning of the fields) alternating with seasonally flooded conditions, wind erosion, water erosion during storm events, hydrophobic surface crusting, and frost heaving all are difficult to overcome.

Investigations into natural recolonization patterns have found that plant succession does not follow the pattern of the original bog development. Typical pioneers are cotton grasses (*Eriophorum* spp.) and birches (*Betula* spp.). Cotton grasses typically die after 10–15 years, but their tussocks form moist microniches, sometimes aiding the slow return of *Sphagnum*. However, *Sphagnum*, so critical to the community, is not typically a pioneer genus and may not colonize for several decades. Under good conditions, bog species such as crowberry (*Empetrum nigrum*), leatherleaf (*Chamaedaphne calyculata*), and other ericads, or larch (*Larix laricina*) colonize eventually, but total cover may not happen for an extended period. For example, after 20 years poorer sites may have only 5–10% cover, while sites with better growing conditions may achieve 50–75% cover. The best sites may achieve 100% vegetative cover, but even when this occurs the results are usually not equivalent to the original peatland community. For example, one abandoned extraction area developed a complete cover of leatherleaf (*C. calyculata*), but still had no *Sphagnum* established within it.

To obtain a self-sustaining wetland plant community, a number of conditions, especially soil saturation, are required. Rewetting

is sometimes achieved by blocking drainage ditches, leveling crowned fields, creating berms to retain precipitation on site, and flooding, where possible. Even with such manipulation, sites are often not wet enough to support establishment of *Sphagnum*. Studies of a particular system in England found that the community established today, 500 years after the initial extraction of peat, was still dissimilar to the original community. Thus, while plant communities can eventually become established on peat extraction sites, restoration to a state equivalent to the original peatland is not likely to be achieved in the short term, especially if plans for development are not made with restoration principles in mind.

Much research has been conducted over the past two decades in Europe, Canada, and, to a lesser extent, the United States. Investigations into the recolonization of *Sphagnum*, rewetting techniques, and edaphic changes from drainage, among other topics, have led to a better understanding of mined peatland management. This knowledge has facilitated the development of management recommendations for restoring mined peatlands to functional ecosystems, if not to their original condition.

—Arthur V. Gilman, Recording Secretary *pro tempore*.

October 2002. President Paul Somers introduced Past-President C. Barre Hellquist who spoke to the Club on "Dodging crocodiles in tropical Australia for aquatic plants." Barre spoke at length of his tenth trip to Australia since the 1981 Botanical Congress (Sydney), which served as a follow-up trip to his 1997 sabbatical research. Like that past sabbatical endeavor, this two-month expedition included teaming up with Surrey Jacobs of the Royal Botanic Garden – Sydney. This fieldwork focused primarily on the aquatic genus *Nymphaea*, the water-lilies.

Barre's quests for aquatic plants took him from the northernmost point on the mainland, the tip of the Cape York Peninsula in Queensland, through the rugged Kimberley at the northern end of Western Australia. In all, this venture carried him by train, plane, automobile, and helicopter to some of the most remote places for fieldwork.

Australia is home to numerous plants adapted to its permanent or temporary freshwater bodies, and serves as the center of diversity for several groups. The essentially cosmopolitan Menyan-

thaceae is centered there with three of its five aquatic genera, including *Nymphoides* (water snowflakes). This genus is most diverse in Australia with 20+ species, including *N. exigua*, *N. cristata*, and *N. indica*. The often-aquatic Haloragaceae is also most diverse in Australia with about 20 species of *Myriophyllum* (water mil-foils) alone, including *M. latifolium* and *M. verrucosum*.

Australia also boasts the world's largest water-lilies and arguably some of the most beautiful tropical water-lilies. The genus *Nymphaea* (Nymphaeaceae) is well represented (subgenera *Anecphya*, *Brachyceras*, and *Lotos*) in the country and often presents itself as a taxonomic challenge. Unusual flower colors and morphological variations are plentiful, and upon further study may be the basis for the naming of new species or hybrids. For example, the marked floral variation found in *N. violacea* calls into question its current taxonomic limits. Typically this species has fragrant blue flowers with short stipules. However, atypical white flowered, long-stipuled populations have been found lacking fragrance. Other populations have exhibited unusual purple-striped sepals and peduncles, yet with otherwise typical flowers.

Low Lake in Queensland, which serves as a dumping ground for troublesome crocodiles, hosts a remarkable population of *Nymphaea atrans*. This is typically a "changeable" species, in which the flower color gradually changes over the course of blooming from bluish-white to pink to dark red. At this locale, however, the flower color remains constant during the days of anthesis. Other unusual variations include an odorless night-blooming *N. pubescens*; a diminutive, faint-smelling, day-blooming *N. noucheli*; and a white-flowered *N. immutabilis*. There was a special variant discovered in Queensland with less bronze-colored foliage and purple flowers that may be described as a new species.

In the Kimberley region, one of Australia's last frontiers, other notable Nymphaeaceae were observed. An unusual population of "*Nymphaea immutabilis*" was found as well as typical *Ondinea purpurea*. *Ondinea* is the only monotypic genus in the water-lily family and is endemic to Australia. Attempts to cultivate this genus, as well as other Australian water-lilies, have been largely unsuccessful.

—Donald J. Padgett, Recording Secretary *pro tempore*.